

1                   **TITLE OF THE INVENTION**

2                   **SYSTEM AND METHOD FOR CONTROLLING A PRINTING DEVICE**

3                   **CLAIM OF PRIORITY**

4                   This application makes reference to, incorporates the same herein, and claims all benefits  
5                   accruing under 35 U.S.C. §119 from an application entitled *System and Method for Controlling a*  
6                   *Printer* earlier filed in the Korean Industrial Property Office on 20 November 1999, and there duly  
7                   assigned Serial No. 99-51744 by that Office.

1                   **BACKGROUND OF THE INVENTION**

2                   **Field of the Invention**

3                   The present invention relates to a method for controlling a printing device, and more  
4                   particularly, to a system and method for controlling a printing device, capable of enabling a specific  
5                   user to temporarily occupy a specific cassette or a specific sheet output position under certain  
6                   conditions during the process of driving a printing device connected to a plurality of user computers  
7                   through a network, thus preventing specific contents from being undesirably printed by another user  
8                   when the specific user prints the specific contents using printing sheets.

16                  **Description of the Related Art**

17                  In general, in outputting documents and drawings prepared by a working equipment such as  
18                  a personal computer (PC) by a printing device, a plurality of PCs are simultaneously connected to

1 a printing device shared by a plurality of PC users through a network. A printing device generally  
2 includes a cassette and a sheet outputting unit. However, the number of PCs connected to the  
3 printing device is limited. Therefore, when the number of used PCs is large, the number of printing  
4 devices which must be connected to the PCs increases accordingly. This is disadvantageous in  
5 saving space.

6 A printing device including various cassettes for various sizes of sheets such as A5, A4, A3,  
7 and B5 and a plurality of sheet outputting units is provided in order to let more PCs share a printing  
8 device, to thus solve the above problem. When such a printing device is used, it is possible to save  
9 space and to let a plurality of PC users select cassettes and sheet outputting units that are required  
10 for each of the users, to thus let the plurality of PC users simultaneously output specific contents.

11 However, in a network where the printing device including a plurality of cassettes and sheet  
12 outputting units are used, when a user among the plurality of users connected to the printing device  
13 prints specific contents using a cassette and a sheet outputting unit among the plurality of cassettes  
14 and sheet outputting units of the printing device, other contents may be undesirably printed by  
15 another user.

16 For example, when there is a command from the user “B” that specific contents should be  
17 printed by occupying the cassette “A” and the sheet outputting unit “a” while the user “A” prints  
18 other contents by occupying the cassette “A” and the sheet outputting unit “a”, the contents desired  
19 to be printed by the user “B” may be printed on the printing sheets of the user “A”.

20 Since the contents to be printed should be reprinted, working efficiency is lowered and large  
21 amounts of printing sheets are wasted. Therefore, a new system for controlling the printing device  
22 is required for solving the above problems.

Exemplar of the art are U.S. Patent 5,299,296 issued to Padalino, et al. for *Multi-function Machine with Interleaved Job Execution*, U.S. Patent 6,026,258 issued to Fresk et al. for *Method for Temporarily Locking out Print Jobs on a Network Copier When Copier User Is Present*, U.S. Patent 5,220,674 issued to Morgan, et al. for *Local Area Print Server for Requesting and Storing Required Resource Data and Forwarding Printer Status Message to Selected Destination*, U.S. Patent 5,699,493 issued to Davidson, Jr., et al. for *Method and Apparatus for Providing Job Accounting Information to a Host Computer from a Printer*, U.S. Patent 5,819,015 issued to Martin, et al. for *Method and Apparatus for Providing Remote Printer Resource Management*, U.S. Patent 5,727,135 issued to Webb, et al. for *Multiple Printer Status Information Indication*, U.S. Patent 6,025,925 issued to Davidson, Jr., et al. for *Method and Apparatus for Providing Accounting Information to Host Computer from a Printer*. I have found that the art does not show an efficient way to avoid problems with undesirable printing by users on a shared printer.

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide a system and method for controlling a printing device, capable of letting a specific user temporarily occupy a specific cassette or a specific sheet output position under certain conditions during the process of driving a printing device connected to a plurality of user computers through a network, thus preventing other contents from being undesirably printed by another user when the specific user prints specific contents using printing sheets.

It is another object to avoid the undesirable printing by users on a shared printer.

It is still another object to have a way to identify a printing status of a shared printing device.

1 It is yet another object to process print commands and yet have a reliable way to avoid  
2 printing on undesirable printable media.

3 Accordingly, to achieve the above object, there is provided a system for controlling a printing  
4 device according to the present invention, including a printing device having a plurality of sheet  
5 storage units for storing sheets on which images will be formed and a plurality of sheet outputting  
6 units for outputting the sheets on which the images are formed; a manipulation panel having a  
7 display unit for displaying the print state and an input unit for inputting print setting conditions; a  
8 host computer for inputting the print setting conditions and giving a print command to output the  
9 work result of a user to the printing device; and a printing device controller having a host interface  
10 unit for interfacing the host computer, a manipulation panel interface unit for interfacing the  
11 manipulation panel, and a printing device interface unit for interfacing the printing device, the  
12 printing device controller for processing signals received through the interface units.

13 Further, a method for controlling the printing of the printing device controlling system having  
14 a printing device, a manipulating panel, a printing device controller, and a host computer according  
15 to the present invention, includes the steps of initializing a printing device controller and a printing  
16 device by applying electric power to the manipulation panel, the printing device controller, and the  
17 printing device; setting an exclusive use with respect to the cassette and the sheet outputting position  
18 of the printing device under predetermined set conditions, in response to an input from the  
19 manipulation panel or the host computer; and printing specific contents in the cassette and the sheet  
20 outputting position of the printing device that are set to be exclusively used, according to a print  
21 command from the host computer.

1                   **BRIEF DESCRIPTION OF THE DRAWINGS**

2                   A more complete appreciation of this invention, and many of the attendant advantages  
3                   thereof, will be readily apparent as the same becomes better understood by reference to the following  
4                   detailed description when considered in conjunction with the accompanying drawings in which like  
5                   reference symbols indicate the same or similar components, wherein:

6                   FIG. 1 shows the entire network according to the present invention;

7                   FIG. 2A shows an example of displaying a print ready state by the display unit of the  
8                   manipulation panel of FIG. 1;

9                   FIG. 2B shows an example of displaying a print processing state of the display unit of the  
10                  manipulation panel of FIG. 1;

11                  FIG. 2C shows an example of an input by the manipulation panel of FIG. 1;

12                  FIG. 2D shows an example of an input by the host computer of FIG. 1;

13                  FIG. 3 is a flowchart for showing the controlling of a printing device according to the present  
14                  invention;

15                  FIG. 4 is a flowchart for showing the controlling of a step for setting a cassette in the  
16                  flowchart of FIG. 3 in detail;

17                  FIG. 5 is a flowchart for showing the controlling of a printing step in the flowchart of FIG.  
18                  3 in detail; and

19                  FIG. 6 is a flowchart for showing the controlling of an exclusive user displaying step in the  
20                  flowchart of FIG. 4 in detail.

21                   **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

The hardware of the system for controlling a printing device that can be used for the  
controlling of a printing device according to the present invention includes a host computer 1, a  
manipulation panel 2, a printing device controller 3, and a printing device 4, as shown in FIG. 1  
where the structure of an entire network according to the present invention is shown. The host  
computer 1 may be a personal computer (PC), however, any device by which a user can prepare  
documents and drawings and output the preparation results to the printing device may be used as the  
host computer 1. The manipulation panel 2 includes a display unit for displaying a print state and  
an input unit for inputting print set conditions.

The printing device controller 3 includes a host interface unit for interfacing the host computer 1, a manipulation panel interface unit for interfacing the manipulation panel 2, a printing device interface unit for interfacing the printing device 4, and a central processing unit (CPU) with possibly a memory for processing various signals received through the interface units. The printing device 4 includes a plurality of sheet storage units such as cassettes and a plurality of sheet outputting means such as sheet outputting units.

In the present invention, not only the manipulation panel 2 but also the host computer 1 can input print setting conditions.

The manipulation panel 2 of FIG. 1 will be described with reference to FIGS. 2A through 2D.

18 FIGS. 2A and 2B show examples of displaying a print ready state and a print processing state  
19 by the display unit of the manipulation panel 2 according to the input by the manipulation panel 2  
20 or the host computer 1, respectively.

21 The print state such as the print ready state and the print processing state are displayed on the  
22 display unit of the manipulation panel 2 by characters as shown in FIGS. 2A and 2B. The name of

1 the exclusive user and the exclusive cassette are also displayed by characters. Accordingly, users  
2 can easily know who is exclusively using which cassette.

3 FIGS. 2C and 2D show an example of an input by the manipulation panel 2 of FIG. 1 and an  
4 example of the input of exclusive use setting conditions by the host computer 1, respectively.

5 Referring to FIGS. 2C and 2D, the input unit of the manipulation panel 2 and the host  
6 computer each includes a cassette designating unit, a sheet output position designating unit, an  
7 exclusive use display column, an exclusive time designating unit, and a unit for designating the  
8 number of works or print jobs. Also, the input unit of the manipulation panel 2 further includes a  
user display column.

9 The exclusive user writes the specific cassette and the specific sheet outputting position, that  
10 are to be exclusively used in the designating units through input units such as the manipulation panel  
11 or a keyboard attached to the host computer. When the exclusive setting condition is time, the user  
12 writes the time in the exclusive time designating unit. When the exclusive setting condition is the  
13 number of works, the user writes the number of works in the unit for designating the number of  
14 works. The user writes predetermined marks showing that the designated specific cassette and  
15 specific sheet outputting position are exclusively used in the exclusive use display column. Also,  
16 the user writes the name of the exclusive user in the user display column of the input unit of the  
17 manipulation panel 2 so that other users can know who the exclusive user is.

18 When the user gives a print command using the host computer in a state where the exclusive  
19 use is set by the input unit of the manipulation panel 2 or the host computer 1, the printing device  
20 controller 3 controls the printing device so as to process the print command according to the set  
21 conditions.

1       Hereinafter, the controlling of the printing device will be described in more detail with  
2       reference to the attached drawings.

3                 Referring to FIG. 3, in the controlling of the printing device according to the present  
4       invention, when the power supply is applied to a printing device system (the printing device  
5       controller 3, the manipulation panel 2, and the printing device 4) (step S1), the printing device  
6       controller 3 and the printing device 4 are initialized (step S2) and it is determined whether there is  
7       an input from the manipulation panel 2 or the host computer 1 (step S3). When it is determined that  
8       there is an input, it is determined whether there are functions required by the user (steps S4 and S6).  
9                 Although it is shown that there are two determinations as to whether there are the functions or not  
10      (the steps S4 and S6) in FIG. 3, it should be noted that the number of determinations is not limited  
11      thereto, but is corresponding to the total functions required by the user. When it is determined that  
12      there are the functions in the steps S4 and S6, the functions are set (steps S5 and S7). When it is  
13      determined that there are no functions required by the user or when it is determined that there are the  
14      functions required by the user and that the functions are set accordingly, it is determined whether an  
15      exclusive use is to be set with respect to the cassette (step S8). When it is determined that the  
16      exclusive use is to be set with respect to the cassette, the corresponding cassette is set for exclusive  
17      use (step S9). When it is determined that the exclusive use is not set with respect to the cassette or  
18      when the corresponding cassette is set to be exclusively used, it is determined whether an exclusive  
19      use is to be set with respect to a sheet outputting position (step S10). When it is determined that the  
20      exclusive use is to be set with respect to the sheet outputting position, the corresponding sheet  
21      outputting position is set for exclusive use (step S11). When it is determined that the exclusive use  
22      is not set with respect to the sheet outputting position or when the corresponding sheet outputting

1 position is set to be exclusively used, the process proceeds to a step S12 for determining whether  
2 there is a print command. As mentioned above, in the step (S9) of setting the corresponding cassette  
3 to be exclusively used and the step (S11) of setting the corresponding sheet outputting position to  
4 be exclusively used, the exclusive user who can temporarily occupy a specific cassette or a specific  
5 sheet outputting position under certain conditions, is set.

6 A method for controlling the setting of the exclusive user in the step (S9) of setting the  
7 corresponding cassette to be exclusively used will be described in detail with reference to FIG. 4.

8 When the controlling of the printing device by the manipulation panel 2 or the host computer  
9 is set, it is determined whether the print command is received from the host computer (step S12).  
10 When it is determined that the print command is not received from the host computer, the step (S3)  
11 of determining whether there is an input from the manipulation panel or the host computer through  
12 the step (S11) of setting the corresponding sheet outputting position to be exclusively used are  
13 repeated. When it is determined that the print command is received from the host computer in the  
14 step S12, data (documents and drawings) transmitted from the host computer are printed (step S13).

15 A method for controlling the setting of the exclusive user in the printing step (S13) will be  
16 described later with reference to FIG. 5.

17 Meanwhile, when a certain period of time elapses after the completion of the printing, the  
18 exclusive use setting is automatically canceled, and accordingly, the printing can be performed by  
19 the next user.

20 Now, the method for controlling the setting of the exclusive user in the step (S9) of setting  
21 the corresponding cassette to be exclusively used in FIG. 3 will be described. FIG. 4 is a detailed  
22 flowchart showing the controlling of the step (S9) of setting the corresponding cassette to be

1 exclusively used. Step S9 is included in the flowchart of FIG. 3 showing the controlling of the  
2 printing device.

3 In the controlling of the step of setting the corresponding cassette to be exclusively used, a  
4 cassette is designated (step S9-1) and it is determined whether the designated cassette is set to be  
5 exclusively used by another user (step S9-2). When it is determined that the designated cassette is  
6 set to be exclusively used by another user, the word "unusable" is displayed on the display unit of  
7 the manipulation panel 2 (step S9-3). Instead of displaying "unusable", it is possible to display  
8 "next exclusive user designation stand-by" on the display unit of the manipulation panel 2 in order  
9 to announce that the next exclusive user is awaiting to print data after the current exclusive user  
10 completes printing data. After displaying "unusable" or "next exclusive user designation stand-by"  
11 on the display unit of the manipulation panel 2 in the step S9-3, it is determined whether the cassette  
12 is re-designated (step S9-4). When it is determined that the cassette is re-designated, the process  
13 returns to the step S9-1 and the cassette is reset. When it is determined that the cassette is not re-  
14 designated, the process proceeds to a step S9-13 and the setting of the cassette is completed.  
15

When it is determined that the designated cassette is not set to be exclusively used by another  
user in the step S9-2, it is determined whether an exclusive user is designated (step S9-5). When it  
is determined that the exclusive user is not designated, the process proceeds to the step S9-13 and  
the setting of the cassette is completed. When it is determined that the exclusive user is designated,  
it is determined whether the designated cassette is a basic (or default) cassette (step 9-6). When it  
is determined that the designated cassette is the basic cassette, the process returns to the step S9-3  
and "unusable" is displayed on the display unit of the manipulation panel 2. When it is determined  
that the designated cassette is not the basic cassette, the exclusive user is designated (step S9-7) and

1 it is determined whether the exclusive use condition is set by the time (step S9-8). When it is  
2 determined that the exclusive use condition is set by the time, the setting of the cassette is completed  
3 (step S9-13) after inputting the exclusive use time (step S9-9), starting to operate a timer (step S9-  
4 10), and displaying the exclusive user (step S9-12). When it is determined that the exclusive use  
5 condition is not set by the time, the setting of the cassette is completed (the step S9-13) after  
6 inputting the number of exclusive use works (step S9-11) and displaying the exclusive user (step S9-  
7 12).

8 Since the controlling of the step of setting the corresponding sheet outputting position to be  
9 exclusively used in FIG. 3 is performed in the same way as that in FIG. 4, the description thereof will  
10 be omitted.

11 Referring to FIG. 5, the method for controlling the setting of the exclusive user in the printing  
12 step (S13) of FIG. 3 will be described in detail. In the process of FIG. 3, the print command is  
13 received from the host computer and it is determined whether the exclusive user is designated with  
14 respect to the cassette or the sheet outputting position (step S13-1). When it is determined that the  
15 exclusive user is not designated with respect to the cassette or the sheet outputting position, the  
16 printing is completed (step S13-6) after processing the host data (step S13-4) and transmitting print  
17 data, which is the processed result, to the printing device (step S13-5). When it is determined that  
18 the exclusive user is designated with respect to the cassette or the sheet outputting position in the  
19 step S13-1, it is determined whether the exclusive use condition is set by the number of works (step  
20 S13-2). When it is determined that the exclusive use condition is set by the number of works, the  
21 working coefficient for counting the number of prosecuted works is increased by one (step S13-3)  
22 and the process proceeds to the steps S13-4 through S13-6.

Referring to FIG. 6, the method for controlling the setting of the exclusive user in the step of displaying the exclusive user (S9-12) in the flowchart of FIG. 4 will be described in detail. In the displaying of the exclusive user in FIG. 4, it is determined whether the exclusive use condition is set by the time (step S9-12-1). When it is determined that the exclusive use condition is set by the time, it is determined whether the used time exceeds the designated time (step S9-12-2). When it is determined that the used time exceeds the designated time, the displaying of the exclusive user is completed (step S9-12-7) after setting the cassette or the sheet outputting position to be basic, stopping the timer, and removing the marks on the display unit that are related to the exclusive user (step S9-12-6). When it is determined that the used time does not exceed the designated time in the step S9-12-2, the exclusive user and items set with respect to the exclusive user are displayed on the display unit of the manipulation panel (step S9-12-3) and the process returns to the step S9-12-1, thus repeating to display the exclusive user. When it is determined that the exclusive use condition is not set by the time in the step S9-12-1, it is determined whether the number of works exceeds a designated value (step S9-12-4). When it is determined that the number of works exceeds the designated value, the displaying of the exclusive user is completed (step S9-12-7) after setting the cassette and/or the sheet outputting position to be basic, stopping the timer, and removing marks on the display unit which are related to the exclusive user (step S9-12-6). When it is determined that the number of works does not exceed the designated value in the step S9-12-4, the exclusive user and the items set with respect to the exclusive user are displayed on the display unit of the manipulation panel (S9-12-5) and the process returns to the step S9-12-1, thus repeating the displaying process until the displaying of the exclusive user is completed.

1 According to the method for controlling the printing device according to the present  
2 invention, it is possible to let a specific user exclusively use a specific cassette or a specific sheet  
3 outputting position under certain conditions during the process of driving the printing device, to thus  
4 prevent the contents of another user from being erroneously printed during a printing operation.  
5 Therefore, since it is not necessary to perform reprinting due to printing errors, it is possible to  
6 improve working efficiency and to save printing sheets.

7 While this invention has been particularly shown and described with reference to preferred  
8 embodiments thereof, it will be understood by those skilled in the art that various changes in form  
and details may be made therein without departing from the spirit and scope of the invention as  
defined by the appended claims.